



[6450-01-P]

DEPARTMENT OF ENERGY

10 CFR Part 431

[EERE-2017-BT-STD-0032]

RIN 1904-AE07

Energy Conservation Program: Energy Conservation Standards for Evaporatively-Cooled Commercial Package Air Conditioners and Water-Cooled Commercial Package Air Conditioners

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Request for information.

SUMMARY: The U.S. Department of Energy (“DOE”) is initiating an effort to determine whether to amend the current energy conservation standards for evaporatively-cooled commercial package air conditioners and water-cooled commercial package air conditioners (referred to as evaporatively-cooled commercial unitary air conditioners (ECUACs) and water-cooled commercial unitary air conditioners (WCUACs) in this document, respectively). Under the Energy Policy and Conservation Act of 1975, as amended, DOE must review these standards at least once every six years and publish either a notice of proposed rulemaking (“NOPR”) to propose new standards for ECUACs and WCUACs or a notice of determination that the existing standards do not need to be amended. This request for information (“RFI”) solicits information from the public to help DOE determine whether amended standards for ECUACs and WCUACs would result in significant additional conservation of energy and whether such standards would be technologically feasible and economically justified. DOE welcomes written comments from

the public on any subject within the scope of this document (including topics not raised in this RFI).

DATES: Written comments and information are requested and will be accepted on or before [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].

ADDRESSES: Interested persons are encouraged to submit comments using the Federal eRulemaking Portal at <http://www.regulations.gov>. Follow the instructions for submitting comments. Alternatively, interested persons may submit comments, identified by docket number and provide docket number EERE-2017-BT-STD-0032, by any of the following methods:

1. *Federal eRulemaking Portal:* <http://www.regulations.gov>. Follow the instructions for submitting comments.
2. *Email:* WCandECUAC2017STD0032@ee.doe.gov. Include the docket number EERE-2017-BT-STD-0032 in the subject line of the message.
3. *Postal Mail:* Appliance and Equipment Standards Program, U.S. Department of Energy, Building Technologies Office, Mailstop EE-5B, 1000 Independence Avenue, SW., Washington, DC, 20585-0121. Telephone: (202) 287-1445. If possible, please submit all items on a compact disc ("CD"), in which case it is not necessary to include printed copies.
4. *Hand Delivery/Courier:* Appliance and Equipment Standards Program, U.S. Department of Energy, Building Technologies Office, 950 L'Enfant Plaza, SW., 6th Floor, Washington, DC, 20024. Telephone: (202) 287-1445. If possible, please submit all items on a CD, in which case it is not necessary to include printed copies.

No telefacsimilies (faxes) will be accepted. For detailed instructions on submitting comments and additional information on this process, see section III of this document.

Docket: The docket for this activity, which includes *Federal Register* notices, comments, and other supporting documents/materials, is available for review at <http://www.regulations.gov>. All documents in the docket are listed in the <http://www.regulations.gov> index. However, some documents listed in the index, such as those containing information that is exempt from public disclosure, may not be publicly available.

The docket web page can be found at <http://www.regulations.gov/#!docketDetail;D=EERE-2017-BT-STD-0032>. The docket web page contains instructions on how to access all documents, including public comments, in the docket. See section III for information on how to submit comments through <http://www.regulations.gov>.

FOR FURTHER INFORMATION CONTACT:

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Mr. Pete Cochran, U.S. Department of Energy, Office of the General Counsel, GC-33, 1000 Independence Avenue, SW., Washington, DC, 20585-0121. Telephone: (202) 586-9496. Email: Peter.Cochran@hq.doe.gov.

For further information on how to submit a comment, or review other public comments and the docket contact the Appliance and Equipment Standards Program staff at (202) 287-1445 or by email: ApplianceStandardsQuestions@ee.doe.gov.

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I. Introduction

A. Authority and Background

The Energy Policy and Conservation Act of 1975, as amended (“EPCA”),¹ among other things, authorizes DOE to regulate the energy efficiency of a number of consumer products and certain industrial equipment. (42 U.S.C. 6291–6317) Title III, Part C² of EPCA established the Energy Conservation Program for Certain Industrial Equipment, which sets forth a variety of provisions designed to improve energy efficiency. This equipment includes ECUACs and WCUACs, the subject of this RFI. (42 U.S.C. 6311(1)(B)-(D))

¹ All references to EPCA in this document refer to the statute as amended through America’s Water Infrastructure Act of 2018, Public Law 115-270 (October 23, 2018).

² For editorial reasons, upon codification in the U.S. Code, Part C was redesignated Part A-1.

Under EPCA, DOE's energy conservation program consists essentially of four parts: (1) testing, (2) labeling, (3) Federal energy conservation standards, and (4) certification and enforcement procedures. Relevant provisions of EPCA include definitions (42 U.S.C. 6311), energy conservation standards (42 U.S.C. 6313), test procedures (42 U.S.C. 6314), labeling provisions (42 U.S.C. 6315), and the authority to require information and reports from manufacturers (42 U.S.C. 6316).

Federal energy efficiency requirements for covered equipment established under EPCA generally supersede State laws and regulations concerning energy conservation testing, labeling, and standards. (42 U.S.C. 6316(a) and (b); 42 U.S.C. 6297) DOE may, however, grant waivers of Federal preemption in limited instances for particular State laws or regulations, in accordance with the procedures and other provisions set forth under 42 U.S.C. 6316(b)(2)(D).

EPCA contains mandatory energy conservation standards for commercial heating, air-conditioning, and water-heating equipment. (42 U.S.C. 6313(a)) Specifically, the statute sets standards for small, large, and very large commercial package air conditioning and heating equipment, packaged terminal air conditioners (PTACs) and packaged terminal heat pumps (PTHPs), warm-air furnaces, packaged boilers, storage water heaters, instantaneous water heaters, and unfired hot water storage tanks. *Id.* In doing so, EPCA established Federal energy conservation standards that generally correspond to the levels in American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Standard 90.1, "Energy Standard for Buildings Except Low-Rise Residential Buildings, as in effect on October 24, 1992 (*i.e.*, ASHRAE Standard 90.1-1989). ECUACs and WCUACs are covered under EPCA's definition of commercial package air conditioning and heating equipment. (42 U.S.C. 6311(8)) EPCA

established initial standards for ECUACs and WCUACs with cooling capacity less than 240,000 Btu/h. (42 U.S.C. 6313(a))

If ASHRAE Standard 90.1 is amended with respect to the standard levels or design requirements applicable under that standard for certain commercial equipment, including ECUACs and WCUACs, not later than 180 days after the amendment of the standard, DOE must publish in the *Federal Register* for public comment an analysis of the energy savings potential of amended energy efficiency standards. (42 U.S.C. 6313(a)(6)(A)(i)) With certain exceptions,³ DOE must adopt amended energy conservation standards at the new efficiency level in ASHRAE Standard 90.1, unless clear and convincing evidence supports a determination that adoption of a more-stringent efficiency level as a national standard would produce significant additional energy savings and be technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii)) If DOE adopts as a national standard the efficiency levels specified in the amended ASHRAE Standard 90.1, DOE must establish such standard not later than 18 months after publication of the amended industry standard. (42 U.S.C. 6313(a)(6)(A)(ii)(I)) If DOE determines that a more-stringent standard is appropriate under the statutory criteria, DOE must establish the more-stringent standard not later than 30 months after publication of the revised ASHRAE Standard 90.1. (42 U.S.C. 6313(a)(6)(B))

EPCA also requires that every six years DOE evaluate the energy conservation standards for certain commercial equipment, including ECUACs and WCUACs, and publish either a notice of determination that the standards do not need to be amended, or a NOPR that includes new proposed energy conservation standards (proceeding to a final rule, as appropriate). (42 U.S.C.

³ DOE cannot adopt an ASHRAE standard that (1) increases energy use or decreases the minimum required energy efficiency or (2) results in the unavailability in any equipment class of performance characteristics that are currently available in the market. (42 U.S.C. 6313(a)(6)(B)(iii))

6313(a)(6)(C)(i)) EPCA further provides that, not later than 3 years after the issuance of a final determination not to amend standards, DOE must publish either a notice of determination that standards for the product do not need to be amended, or a NOPR including new proposed energy conservation standards (proceeding to a final rule, as appropriate). (42 U.S.C.

6313(a)(6)(C)(iii)(II)) DOE must make the analysis on which the determination is based publicly available and provide an opportunity for written comment. (42 U.S.C.

6313(a)(6)(C)(ii)) Further, a determination that more-stringent standards would (1) result in significant additional conservation of energy and (2) be both technologically feasible and economically justified must be supported by clear and convincing evidence. (42 U.S.C.

6313(a)(6)(C)(i); 42 U.S.C. 6313(a)(6)(A))

Following an update to ASHRAE Standard 90.1 (*i.e.*, ASHRAE Standard 90.1-2010), DOE published a final rule on May 16, 2012 (“May 2012 final rule”), amending the standards for 12 classes of ECUACs and WCUACs by adopting the energy efficiency ratio (EER) levels for this equipment established in ASHRAE 90.1-2010. 77 FR 28928. Since ASHRAE Standard 90.1-2010 was published, ASHRAE Standard 90.1 has undergone two revisions. On October 9, 2013, ASHRAE published ASHRAE Standard 90.1-2013, and on October 31, 2016, ASHRAE published ASHRAE Standard 90.1-2016. In neither of these publications did ASHRAE amend minimum EER levels for small, large, and very large water-cooled and evaporatively-cooled unitary air conditioners, and, thus, DOE was not triggered to examine amended standards for this equipment under 42 U.S.C. 6313(a)(6)(A). As a result, the current standards for ECUACs and WCUACs are those set forth in the May 2012 final rule and codified at 10 CFR 431.97. These standards are reproduced in Table I.1.

Table I.1 Federal Energy Conservation Standards for Water-Cooled and Evaporatively-Cooled Commercial Package Air-Conditioning and Heating Equipment

Equipment Type	Cooling Capacity (Btu/h)	Heating Type	Minimum EER	Compliance Date
Small Water-Cooled	<65,000	All	12.1	October 29, 2003
Small Water-Cooled	$\geq 65,000$ and <135,000	No Heating or Electric Resistance Heating	12.1	June 1, 2013
		All Other Types of Heating	11.9	June 1, 2013
Large Water-Cooled	$\geq 135,000$ and <240,000	No Heating or Electric Resistance Heating	12.5	June 1, 2014
		All Other Types of Heating	12.3	June 1, 2014
Very Large Water-Cooled	$\geq 240,000$ and <760,000	No Heating or Electric Resistance Heating	12.4	June 1, 2014
		All Other Types of Heating	12.2	June 1, 2014
Small Evaporatively-Cooled	<65,000	All	12.1	October 29, 2003
Small Evaporatively-Cooled	$\geq 65,000$ and <135,000	No Heating or Electric Resistance Heating	12.1	June 1, 2013
		All Other Types of Heating	11.9	June 1, 2013
Large Evaporatively-Cooled	$\geq 135,000$ and <240,000	No Heating or Electric Resistance Heating	12.0	June 1, 2014
		All Other Types of Heating	11.8	June 1, 2014
Very Large Evaporatively-Cooled	$\geq 240,000$ and <760,000	No Heating or Electric Resistance Heating	11.9	June 1, 2014
		All Other Types of Heating	11.7	June 1, 2014

DOE is publishing this RFI to collect data and information to inform its decision consistent with its obligation under EPCA.

B. Rulemaking Process

DOE must follow specific statutory criteria for prescribing new or amended standards for covered equipment. EPCA requires that in order to adopt a more-stringent standard for ECUACs and WCUACs, DOE must determine, supported by clear and convincing evidence, that adoption of a more-stringent efficiency level as a national standard would produce significant additional energy savings and be technologically feasible and economically justified. (42 U.S.C.

6313(a)(6)(C)(i); 42 U.S.C. 6313(a)(6)(A)) To determine whether a standard is economically justified, EPCA requires that DOE determine whether the benefits of the standard exceed its burdens by considering, to the greatest extent practicable, the following seven factors:

- 1) The economic impact of the standard on the manufacturers and consumers of the affected products;
- 2) The savings in operating costs throughout the estimated average life of the product compared to any increases in the initial cost, or maintenance expenses;
- 3) The total projected amount of energy and water (if applicable) savings likely to result directly from the standard;
- 4) Any lessening of the utility or the performance of the products likely to result from the standard;
- 5) The impact of any lessening of competition, as determined in writing by the Attorney General, that is likely to result from the standard;
- 6) The need for national energy and water conservation; and
- 7) Other factors the Secretary of Energy (Secretary) considers relevant.

(42 U.S.C. 6313(a)(6)(B)(ii))

DOE fulfills these and other applicable requirements by conducting a series of analyses throughout the rulemaking process. Table I.2 shows the individual analyses that are performed to satisfy each of the requirements within EPCA.

Table I.2 EPCA Requirements and Corresponding DOE Analysis

EPCA Requirement	Corresponding DOE Analysis
Significant Energy Savings	<ul style="list-style-type: none"> • Shipments Analysis • National Impact Analysis • Energy and Water Use Determination
Technological Feasibility	<ul style="list-style-type: none"> • Market and Technology Assessment • Screening Analysis • Engineering Analysis
Economic Justification:	
1. Economic impact on manufacturers and consumers	<ul style="list-style-type: none"> • Manufacturer Impact Analysis • Life-Cycle Cost and Payback Period Analysis • Life-Cycle Cost Subgroup Analysis • Shipments Analysis
2. Lifetime operating cost savings compared to increased cost for the product	<ul style="list-style-type: none"> • Markups for Product Price Determination • Energy and Water Use Determination • Life-Cycle Cost and Payback Period Analysis
3. Total projected energy savings	<ul style="list-style-type: none"> • Shipments Analysis • National Impact Analysis
4. Impact on utility or performance	<ul style="list-style-type: none"> • Screening Analysis • Engineering Analysis
5. Impact of any lessening of competition	<ul style="list-style-type: none"> • Manufacturer Impact Analysis
6. Need for national energy and water conservation	<ul style="list-style-type: none"> • Shipments Analysis • National Impact Analysis
7. Other factors the Secretary considers relevant	<ul style="list-style-type: none"> • Employment Impact Analysis • Utility Impact Analysis • Emissions Analysis • Monetization of Emission Reductions Benefits • Regulatory Impact Analysis

As detailed throughout this RFI, DOE is publishing this document seeking input and data from interested parties to aid in the development of an energy use analysis for ECUACs and WCUACs. The issues relevant to the energy use analysis are also relevant to the technical and economic analyses should DOE determine it necessary to conduct them. In addition to the specific issues identified in the following section on which DOE requests comment, DOE requests comment on its overall approach and analyses used to evaluate potential standard levels for ECUACs and WCUACs.

II. Requests for Information and Comments

DOE seeks comment on whether there have been sufficient technological or market changes since the most recent standards update that may justify a new rulemaking to consider more stringent standards. Specifically, DOE seeks data and information that could enable the agency to determine whether DOE should propose a “no new standard” determination because a more-stringent standard: (1) would not result in significant additional savings of energy; (2) is not technologically feasible; (3) is not economically justified; or (4) any combination of the foregoing. In the following sections, DOE has identified a variety of issues on which it seeks input to aid in determining whether to proceed with a “no new standard” determination or propose more-stringent standards for ECUACs and WCUACs.

A. Market Analysis

In preparation for this RFI, DOE conducted a review of the current market for ECUACs and WCUACs, including equipment literature, and the DOE Compliance Certification Management System (CCMS) database.⁴ In addition, DOE reviewed market data and stakeholder comments received as part of the previous standards rulemaking for ECUACs and WCUACs, as well as the energy savings potential for amended standards determined in that rulemaking. The following subsections discuss DOE’s analysis of the current market for ECUACs and WCUACs as well as relevant results from the May 2012 final rule, including shipments estimates.

⁴ The DOE CCMS database can be found at: <http://www.regulations.doe.gov/certification-data/>.

1. Shipments Estimates

As part of the previous rulemaking, AHRI provided historical shipments data from 1989 to 2009 for WCUACs by cooling capacity range. DOE searched for, but was unable to identify, publicly available sources of shipments of ECUACs and WCUACs.

Previously submitted historical AHRI data showed strongly decreasing shipments for certain small (*i.e.*, greater than 65,000 Btu/h and less than 135,000 Btu/h cooling capacity) and large WCUACs over the period from 1989 to 2009. (Docket No. EERE-2011-BT-STD-0029-0003) For the analyses conducted for a notice of data availability (NODA) published on May 5, 2011 (“May 2011 NODA”), DOE developed shipments projections for these equipment classes using an exponential curve fit to the 21 years of available data. 76 FR 25622, 25641-25642. The energy savings estimates from the May 2011 NODA (which depend on the shipments projections) were presented unchanged in the May 2012 final rule. 77 FR 28969-28971. Because the historical trends showed a steep decline in shipments for these classes, the shipment projections resulted in very few shipments by the end of the 30-year analysis period. For very large WCUACs, the decline in shipments was less definitive, although a linear fit of the available 21 years of shipment data showed gradually declining shipments. For each of the WCUAC equipment classes analyzed, DOE used these shipments data to analyze two shipment scenarios: (1) based on historical trends of declining shipments, and (2) based on shipments remaining constant at 2009 levels. DOE analyzed the energy savings potential by equipment class for both scenarios to provide a range of energy savings estimates. 76 FR 25641-25642. Estimates of annual shipments averaged over the 30-year analysis periods used in the previous rulemaking, 2013–2042 for small WCUACs and 2014–2043 for large and very large WCUACs, resulted in the shipment estimates shown in Table II.1 for each equipment class.

In the May 2012 final rule analysis, DOE did not identify any models of certain small (*i.e.*, greater than 65,000 Btu/h but less than 135,000 Btu/h cooling capacity) or large ECUACs, and thus DOE assumed no shipments for these equipment classes. *Id.* At 76 FR 25639. DOE identified multiple models of very large ECUACs. Because no shipments data were available for ECUACs, DOE developed shipment estimates based on the ratio of the number of identified models of very large ECUACs (9) to the number of models of very large WCUACs (35). *Id.* at 76 FR 25642. The average of the projected shipments per year (averaged over the 30-year analysis period) under both scenarios considered is shown in Table II.1. Average shipment estimates for ECUACs and WCUACs in Table II.1 are shown as ranges bounded by the estimates for the two different analyzed shipment scenarios (*i.e.*, (1) based on historical trends of declining shipments, and (2) based on shipments remaining constant at 2009 levels). Shipments for ECUACs and WCUACs are also shown as a percentage of package air conditioner and package heat pump annual shipments reported by AHRI, averaged over the 5-year period from 2013–2017, for each cooling capacity range.⁵

⁵ U.S. Manufacturers' Shipments of Central Air Conditioners and Air-Source Heat Pumps by Btu/h, AHRI Shipments Data. <http://www.ahrinet.org/Resources/Statistics/Historical-Data/Central-Air-Conditioners-and-Air-Source-Heat-Pumps.aspx> (last accessed April 8, 2019). DOE interprets the cited AHRI data as consisting of shipments for air-cooled and water-cooled package air conditioners and air-cooled heat pumps. Because the AHRI data uses cooling capacity ranges that differ from DOE's equipment class structure, AHRI shipments data for equipment with cooling capacity between 135,000 and 249,900 Btu/h are included in the row designated for equipment with cooling capacity $\geq 135,000$ and $< 240,000$ Btu/h in Table II.1. Additionally, AHRI shipments data for equipment with cooling capacity greater than or equal to 640,000 Btu/h are included in the row designated for equipment with cooling capacity $\geq 240,000$ and $< 760,000$ Btu/h in Table II.1. DOE estimates that shipments of package air conditioners with cooling capacity greater than 760,000 Btu/h are very small relative to shipments of all very large packaged air conditioner and heat pumps (*i.e.*, with cooling capacity $\geq 240,000$ Btu/h and $< 760,000$ Btu/h).

Table II.1 Shipments for Water-Cooled, Evaporatively-Cooled, and Air-Cooled Air-Conditioning and Heating Equipment by Equipment Class

Equipment Type	Cooling Capacity (Btu/h)	Annual Shipments – Average over 30 Years (Low and High Projections from May 2012 Final Rule)*	AHRI Package AC/HP Annual Shipments**	Percentage of AHRI Package AC/HP Shipments (%)
Small Water-Cooled	≥65,000 and <135,000	51–152	180,377	0.03–0.08
Large Water-Cooled	≥135,000 and <240,000	85–182	72,797	0.12–0.25
Very Large Water-Cooled	≥240,000 and <760,000	585–909	27,282	2.1–3.3
Small Evaporatively-Cooled	≥65,000 and <135,000	0	180,377	0
Large Evaporatively-Cooled	≥135,000 and <240,000	0	72,797	0
Very Large Evaporatively-Cooled	≥240,000 and <760,000	150–234	27,282	0.55–0.86

* Projected average annual shipments shown were averaged over the 30-year analysis periods used in the May 2012 final rule analysis: 2013–2042 for small WCUACs, and 2014–2043 for large and very large WCUACs and very large ECUACs. Shipment estimates in the May 2012 final rule were developed for two different scenarios: (1) based on historical trends of declining shipments, and (2) based on shipments remaining constant at 2009 levels. Estimates for the two different scenarios are the bounds for the ranges of shipments provided for each equipment class.

** U.S. Manufacturers’ Shipments of Central Air Conditioners and Air-Source Heat Pumps by Btu/h, AHRI Shipments Data. <http://www.ahrinet.org/Resources/Statistics/Historical-Data/Central-Air-Conditioners-and-Air-Source-Heat-Pumps.aspx> (last accessed April 8, 2019).

As shown in Table II.1, average shipments of ECUAC and WCUACs with cooling capacity greater than or equal to 65,000 Btu/h were previously estimated to be less than 1,000 for each equipment class and are only a small fraction of shipments of air-cooled commercial unitary air conditioners (ACUACs). DOE is not aware of any publicly-available shipments data for ECUACs or WCUACs more recent than the data presented in the May 2012 final rule. On July 25, 2017, DOE published an RFI for test procedures for several categories of commercial air conditioners and heat pumps, including ECUACs and WCUACs (“July 2017 TP RFI”). 82 FR 34427. In response to the July 2017 TP RFI, Goodman Global, Inc (Goodman) stated that the

market for WCUACs is extremely small and represents only a fraction of a percentage of ACUAC shipments. (Docket No. EERE-2017-BT-TP-0018-0014 at p. 3)

Issue A.1 DOE seeks comment on whether the shipments estimates for WCUACs and ECUACs analyzed in the May 2012 final rule are representative of the current market.

Issue A.2 DOE requests feedback and/or data on historical and recent shipments for each of the current seven equipment classes of WCUACs and seven equipment classes of ECUACs, including for units with cooling capacity less than 65,000 Btu/h. DOE also seeks evidence or reasoning for expected trends in future shipments that differ from those analyzed in the May 2012 final rule.

Issue A.3 DOE requests feedback on whether the historical decline in shipments for WCUACs that was found in the May 2012 final rule analysis still applies for the current WCUAC market. Specifically, DOE seeks information on market forces that are expected to influence future WCUAC shipment trends and could support DOE's assessment of future shipments. DOE also requests feedback on the market forces affecting shipments for the ECUAC market, and on whether there is any information to suggest a growing or declining market. DOE requests any shipment data that maps into the model counts as shown in table II.2.

2. Model Counts

For this RFI, DOE conducted a review of the current market for WCUACs and ECUACs based on models included in the DOE CCMS database. DOE also compared the number of ECUAC and WCUAC models to the number of ACUAC models listed in DOE's CCMS database. Table II.22 shows the number of models listed within the DOE CCMS database⁶ that DOE has identified for each class of ACUACs, ECUACs, and WCUACs.

⁶ Accessed on April 1, 2019.

Table II.2 Model Counts for Evaporatively-Cooled, Water-Cooled, and Air-Cooled Air Conditioners by Equipment Class

Cooling Capacity Range (Btu/h)	Number of Models		
	Evaporatively-Cooled	Water-Cooled	Air-Cooled
<65,000	9	15	2,307*
≥65,000 and <135,000	0	49	2,301
≥135,000 and <240,000	0	33	1,975
≥240,000 and <760,000	15	251	2,843

* This <65,000 Btu/h air-cooled model count includes only unique basic models of three-phase air-cooled commercial air conditioners with cooling capacity less than 65,000 Btu/h.

As shown in Table II.22, the number of models of ECUACs and WCUACs currently on the market is significantly less than the number of ACUAC models on the market for all capacity ranges, suggesting that the current market for ECUACs and WCUACs is much smaller than the market for ACUACs.

In the May 2012 final rule, DOE did not analyze small ECUACs and WCUACs with cooling capacity less than 65,000 Btu/h. As shown in Table II.22 of this RFI, DOE's CCMS database includes 9 models of ECUACs with cooling capacity less than 65,000 Btu/h and 15 models of WCUACs with cooling capacity less than 65,000 Btu/h. DOE identified only one manufacturer of ECUACs in this capacity range, and the models offered by this manufacturer are single-phase equipment and appear to be predominantly marketed for residential applications. Further, examination of the manufacturer literature for these models indicates that they are marketed specifically toward regions of the United States with hot and dry climates, suggesting that there are few if any shipments in other regions of the United States. In contrast, there are listings for over 3,000 basic models of air-cooled residential central air conditioners (CACs) in DOE's CCMS database, suggesting that evaporatively-cooled units comprise a very small share of the market for residential air conditioners.

DOE's CCMS database includes data for only two distinct product lines of WCUACs with cooling capacity less than 65,000 Btu/h. From examination of manufacturer literature for

WCUACs with cooling capacity less than 65,000 Btu/h, the unit design and marketed application of these WCUAC models suggest that they do not comprise a significant share of the market for air conditioners in residential or commercial applications. As shown in Table II.22, the model count of WCUACs with cooling capacity less than 65,000 Btu/h is less than 1 percent of the model count of three-phase ACUACs in this capacity range.

Issue A.4 DOE seeks comment on the size of the current market for ECUACs and WCUACs, as compared to the market for ACUACs.

3. Current Market Efficiency Distributions

For this RFI, DOE examined the efficiency ratings of ECUACs and WCUACs currently on the market. Table II.3 presents the summary statistics by equipment category and size of equipment from DOE's CCMS database. As mentioned previously in section II.A.2 of this document, there were no ECUAC models listed in the DOE CCMS Database with cooling capacities between 65,000 Btu/h and 240,000 Btu/h.

Table II.3 Current Market Efficiency Distributions for Water-cooled and Evaporatively-Cooled Air Conditioners models

Cooling Capacity Range (Btu/h)	Number of Models	Average Cooling Capacity (Btu/h)	EER			Current Federal EER Standard Level (No heat or electric heat)	Current Federal EER Standard Level (All Other Types of Heating)
			Minimum	Average	Maximum		
Water-Cooled Air Conditioners							
<65,000	15	52,907	12.2	12.9	14.8	12.1*	
≥65,000 and <135,000	49	100,837	12.1	13.3	15.3	12.1	11.9
≥135,000 and <240,000	33	173,939	12.5	15.0	16.3	12.5	12.3
≥240,000 and <760,000	251	485,143	12.5	13.9	16.5	12.4	12.2
Evaporatively-Cooled Air Conditioners							
<65,000	9	38,300	13.2	14.8	16.0	12.1*	
≥65,000 and <135,000	0	N/A	N/A	N/A	N/A	12.1	11.9
≥135,000 and <240,000	0	N/A	N/A	N/A	N/A	12.0	11.8
≥240,000 and <760,000	15	440,267	11.8	12.7	13.4	11.9	11.7

* The <65,000 Btu/h equipment classes for Water-cooled and Evaporatively cooled Air Conditioners are not divided by heating type.

Issue A.5 DOE seeks comment on the range of efficiency levels currently on the market for each equipment class of ECUACs and-WCUACs, and on whether efficiency levels above the current baseline are achievable for equipment across all cooling capacity ranges.

B. Energy Efficiency Descriptors

1. General

The current Federal energy conservation standards for ECUACs and WCUACs use EER as the energy descriptor. DOE notes that in addition to using EER for standard levels, ASHRAE Standard 90.1 also specifies standard levels using the integrated energy efficiency ratio (IEER). Unlike the EER metric, which only utilizes the efficiency of the equipment operating at full load, IEER factors in the efficiency of operating at part loads of 75 percent, 50 percent, and 25 percent of capacity as well as the efficiency at full load. This is accomplished by weighting the full- and

part-load efficiencies with the average amount of time operating at each loading point. Additionally, IEER incorporates reduced condenser temperatures (*i.e.*, reduced entering water temperature for WCUACs and reduced outdoor air dry-bulb and wet-bulb temperatures for ECUACs) for part-load operation. ASHRAE 90.1 has included minimum efficiency levels for ECUACs and WCUACs in terms of both EER and IEER since 2010.

In response to the July 2017 TP RFI, the Appliance Standards Awareness Project (ASAP), Alliance to Save Energy, American Council for an Energy-Efficiency Economy (ACEEE), Northwest Energy Efficiency Alliance (NEEA), and Northwest Power and Conservation Council encouraged DOE to adopt IEER as the metric for WCUACs and ECUACs, stating that WCUACs and ECUACs provide the same function as ACUACs and, like ACUACs, spend most of their operating hours at part load. (Docket No. EERE-2017-BT-TP-0018-0009 at p.4) In contrast, Goodman commented that the WCUAC market is so small that there would be no value in revising the regulated metric to IEER for WCUACs. (Docket No. EERE-2017-BT-TP-0018-0014 at p.3)

In the following sub-sections, three issues regarding IEER for ECUACs and WCUACs are discussed: (1) representativeness of IEER for ECUACs and WCUACs of all capacities; (2) representativeness of IEER for ECUACs with cooling capacity less than 65,000 Btu/h; and (3) potential burdens to manufacturers of IEER testing.

2. Representativeness of IEER for Evaporatively-cooled and Water-cooled Units

As previously mentioned, IEER includes lower condenser temperatures for part-load tests. Specifically, Table II.4 shows the IEER test conditions for ECUACs and WCUACs specified in AHRI 340/360-2019.

Table II.4 IEER Test Conditions for Water-cooled and Evaporatively-cooled Air Conditioners from AHRI 340/360-2019

Percent Load	Water-cooled	Evaporatively-cooled		
	Entering water temperature (°F)	Entering air dry-bulb temperature (°F)	Entering air wet-bulb temperature (°F)	Makeup water temperature (°F)
100%	85.0	95.0	75.0	85.0
75%	73.5	81.5	66.2	81.5
50%	62.0	68.0	57.5	68.0
25%	55.0	65.0	52.8	65.0

Performance of equipment at each of the four IEER testing conditions are combined in a weighted average to determine the IEER rating. The following equation shows the weighting factors for each testing condition.

$$IEER = (0.020 \cdot A) + (0.617 \cdot B) + (0.238 \cdot C) + (0.125 \cdot D)$$

Where (see Table II.4 for condenser temperature for all four test points):

A = EER, Btu/W·h at 100% capacity at standard rating conditions

B = EER, Btu/W·h at 75% capacity and reduced condenser temperature

C = EER, Btu/W·h at 50% capacity and reduced condenser temperature

D = EER, Btu/W·h at 25% capacity and reduced condenser temperature.

The intent of this weighted average across a range of condenser temperatures is to produce an IEER rating that is more representative of outdoor conditions that air conditioners face for much of the year, rather than just the peak temperature experienced in most climates for only a small minority of operating hours. However, these weighting factors may not be representative of typical applications for ECUACs. ECUACs may be disproportionally marketed and sold in relatively hot and dry climates in which there is a larger efficiency benefit to using evaporative condenser cooling. As previously shown in the IEER equation, the weighting factor for the full-load test point is only 2 percent, so almost all of the IEER rating reflects performance at cooler outdoor air temperatures.

Marketing literature for one ECUAC model line advertises its efficient performance at high outdoor air temperatures (90 °F and above) and states that the 95 °F outdoor air temperature used to determine EER is more representative of typical summer heat in hot climates than the lower outdoor air temperatures used to determine the seasonal energy efficiency ratio (SEER) rating (the seasonal cooling metric used for residential central air conditioners). (Docket No. EERE-2017-BT-STD-0032-0001 at p. 4) Presumably the same argument may apply for the suitability of IEER for ECUACs, as 98 percent of performance in the IEER rating is based on outdoor air dry-bulb temperatures of 81.5 °F or less.

In response to the July 2017 TP RFI, the California Investor Owned Utilities (CA IOUs) commented that their locations regularly experience summer ambient dry-bulb temperatures above 110 °F. CA IOUs further stated that the highest ambient IEER test point, 95 °F, does not reflect the conditions experienced in the western climate, and that IEER should include a “hot-dry” test point to reflect the conditions in the western climate. (Docket No. EERE-2017-BT-TP-0018-0007 at p. 3)

Issue B.1 DOE requests information on whether the IEER metric and weighting factors are representative of the average use cycles for ECUACs and WCUACs. Specifically, DOE seeks comment on the extent to which ECUACs and/or WCUACs are installed in hot and dry climates as compared to other climates. DOE also seeks comment on the types of buildings that represent the primary markets for ECUACs and WCUACs. DOE requests this information for all ECUAC and WCUAC equipment classes, including units with cooling capacities less than 65,000 Btu/h.

3. Representativeness of IEER for Evaporatively-cooled Units with Cooling Capacity Less than 65,000 Btu/h

ASHRAE 90.1-2016 includes IEER efficiency requirements for all classes of ECUACs, including ECUACs with cooling capacity less than 65,000 Btu/h. However, DOE's preliminary analysis of models in this equipment class certified in DOE's CCMS database suggests that these units are primarily marketed for residential applications. In contrast, the IEER metric was developed for commercial applications by analyzing air conditioner energy use in commercial buildings. Therefore, it is not clear whether IEER is representative of average use cycles for ECUACs with cooling capacity less than 65,000 Btu/h.

One issue is the condenser conditions and weighting factors used for determining IEER. Over a third of the weighting for determining IEER for ECUACs is based on performance at outdoor air dry-bulb temperatures of 68 °F and 65 °F. While many commercial buildings have substantial cooling loads at these temperatures, residential cooling loads at these temperatures are likely significantly lower. Therefore, for residential applications, IEER may overweight cooling at lower outdoor ambient temperatures and underweight cooling at higher ambient temperatures.

Another issue is that the IEER equation for adjusting for cyclic degradation⁷ (see equation 4 of AHRI 340/360-2019) assumes continuous operation of the indoor fan when the compressor is not operating. While this may be representative of commercial applications (in which the indoor fan often runs continuously to provide ventilation), the indoor fan presumably does not run continuously in many residential applications.

⁷ For units that cannot reduce compressor capacity sufficiently to meet a target IEER load fraction during steady-state operation, the cyclic degradation adjustment in AHRI 340/360-2019 quantifies the reduced efficiency that would be seen in field applications from compressor cycling at part-load conditions.

Issue B.2 DOE requests comment on whether the IEER metric is representative of the average use cycle for ECUACs with cooling capacity less than 65,000 Btu/h. Specifically, DOE seeks comment on whether ECUACs in this equipment class are typically installed in residential or commercial applications. Additionally, DOE seeks feedback on whether the outdoor air dry-bulb and wet-bulb temperatures and weighting factors specified for IEER testing of ECUACs in AHRI 340/360-2019 are representative for ECUACs with cooling capacity less than 65,000 Btu/h. Further, DOE requests comment on whether the indoor fan typically runs continuously for ECUACs in this capacity range when installed in the field.

4. Burden of IEER Testing

Some manufacturers already rate performance in terms of EER and IEER for ECUAC and WCUAC models, but this is not the case for all models. IEER testing involves significantly more tests than an EER test – rather than a single test for EER, an IEER test requires at least four tests, and more tests can be required if interpolation for the target load fraction is needed for any part-load tests.⁸

Issue B.3 DOE requests data on the share of ECUAC and WCUAC models on the market, by capacity range, that are currently rated with both EER and IEER. For models that are not already rated for IEER, DOE also requests comment on the extent to which testing to IEER would impose testing and certification burden on manufacturers, including small business manufacturers.

C. Other Energy Conservation Standards Topics

1. Market Failures

⁸ Per AHRI 340/360-2019, if a unit cannot achieve the target part-load fraction (*i.e.*, 75%, 50%, or 25%) within tolerance but can operate at a load above and below the part load test point at the applicable reduced condenser temperature, the results of both tests at the applicable condenser temperature are used to interpolate the unit performance at the target load fraction.

In the field of economics, a market failure is a situation in which the market outcome does not maximize societal welfare. Such an outcome would result in unrealized potential welfare. DOE welcomes comment on any aspect of market failures, especially those in the context of amended energy conservation standards for ECUACs and WCUACs.

2. Other

DOE welcomes comments on other issues relevant to the conduct of this rulemaking that may not specifically be identified in this document. In particular, DOE notes that under Executive Order 13771, “Reducing Regulation and Controlling Regulatory Costs,” Executive Branch agencies such as DOE are directed to manage the costs associated with the imposition of expenditures required to comply with Federal regulations. See 82 FR 9339 (February 3, 2017). Consistent with that Executive Order, DOE encourages the public to provide input on measures DOE could take to lower the cost of its energy conservation standards rulemakings, recordkeeping and reporting requirements, and compliance and certification requirements applicable to ECUACs and WCUACs while remaining consistent with the requirements of EPCA. Additionally, DOE also recently published an RFI on the emerging smart technology appliance and equipment market. 83 FR 46886 (Sept. 17, 2018). In that RFI, DOE sought information to better understand market trends and issues in the emerging market for appliances and commercial equipment that incorporate smart technology. DOE’s intent in issuing the RFI was to ensure that DOE did not inadvertently impede such innovation in fulfilling its statutory obligations in setting efficiency standards for covered products and equipment. DOE seeks comments, data and information on the issues presented in the RFI as they may be applicable to ECUACs and WCUACs.

III. Submission of Comments

DOE invites all interested parties to submit in writing by **[INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**, comments and information on matters addressed in this notice and on other matters relevant to DOE's consideration of amended energy conservation standards for ECUACs and WCUACs. After the close of the comment period, DOE will review the public comments received and may begin collecting data and conducting the analyses discussed in this RFI.

Submitting comments via <http://www.regulations.gov>. The <http://www.regulations.gov> webpage requires you to provide your name and contact information. Your contact information will be viewable to DOE Building Technologies staff only. Your contact information will not be publicly viewable except for your first and last names, organization name (if any), and submitter representative name (if any). If your comment is not processed properly because of technical difficulties, DOE will use this information to contact you. If DOE cannot read your comment due to technical difficulties and cannot contact you for clarification, DOE may not be able to consider your comment.

However, your contact information will be publicly viewable if you include it in the comment itself or in any documents attached to your comment. Any information that you do not want to be publicly viewable should not be included in your comment, nor in any document attached to your comment. Persons viewing comments will see only first and last names, organization names, correspondence containing comments, and any documents submitted with the comments.

Do not submit to <http://www.regulations.gov> information for which disclosure is restricted by statute, such as trade secrets and commercial or financial information (hereinafter

referred to as Confidential Business Information (“CBI”). Comments submitted through <http://www.regulations.gov> cannot be claimed as CBI. Comments received through the website will waive any CBI claims for the information submitted. For information on submitting CBI, see the Confidential Business Information section.

DOE processes submissions made through <http://www.regulations.gov> before posting. Normally, comments will be posted within a few days of being submitted. However, if large volumes of comments are being processed simultaneously, your comment may not be viewable for up to several weeks. Please keep the comment tracking number that <http://www.regulations.gov> provides after you have successfully uploaded your comment.

Submitting comments via email, hand delivery, or mail. Comments and documents submitted via email, hand delivery, or mail also will be posted to <http://www.regulations.gov>. If you do not want your personal contact information to be publicly viewable, do not include it in your comment or any accompanying documents. Instead, provide your contact information on a cover letter. Include your first and last names, email address, telephone number, and optional mailing address. The cover letter will not be publicly viewable as long as it does not include any comments.

Include contact information each time you submit comments, data, documents, and other information to DOE. If you submit via mail or hand delivery, please provide all items on a CD, if feasible. It is not necessary to submit printed copies. No telefacsimiles (faxes) will be accepted.

Comments, data, and other information submitted to DOE electronically should be provided in PDF (preferred), Microsoft Word or Excel, WordPerfect, or text (ASCII) file format. Provide documents that are not secured, written in English, and free of any defects or viruses.

Documents should not contain special characters or any form of encryption and, if possible, they should carry the electronic signature of the author.

Campaign form letters. Please submit campaign form letters by the originating organization in batches of between 50 to 500 form letters per PDF or as one form letter with a list of supporters' names compiled into one or more PDFs. This reduces comment processing and posting time.

Confidential Business Information. Pursuant to 10 CFR 1004.11, any person submitting information that he or she believes to be confidential and exempt by law from public disclosure should submit via email, postal mail, or hand delivery two well-marked copies: one copy of the document marked "confidential" including all the information believed to be confidential, and one copy of the document marked "non-confidential" with the information believed to be confidential deleted. Submit these documents via email or on a CD, if feasible. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

Factors of interest to DOE when evaluating requests to treat submitted information as confidential include (1) a description of the items, (2) whether and why such items are customarily treated as confidential within the industry, (3) whether the information is generally known by or available from other sources, (4) whether the information has previously been made available to others without obligation concerning its confidentiality, (5) an explanation of the competitive injury to the submitting person that would result from public disclosure, (6) when such information might lose its confidential character due to the passage of time, and (7) why disclosure of the information would be contrary to the public interest.

It is DOE's policy that all comments may be included in the public docket, without change and as received, including any personal information provided in the comments (except information deemed to be exempt from public disclosure).

DOE considers public participation to be a very important part of the process for developing energy conservation standards. DOE actively encourages the participation and interaction of the public during the comment period in each stage of the rulemaking process. Interactions with and between members of the public provide a balanced discussion of the issues and assist DOE in the rulemaking process. Anyone who wishes to be added to the DOE mailing list to receive future notices and information about this process or would like to request a public meeting should contact Appliance and Equipment Standards Program staff at (202) 287-1445 or via e-mail at *ApplianceStandardsQuestions@ee.doe.gov*.

Signed in Washington, DC, on July 22, 2019.

Daniel R. Simmons
Assistant Secretary
Energy Efficiency and Renewable Energy

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